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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,911	02/10/2004	Dennis R. Morgan	13	1216

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EXAMINER	
LEE, DAVID J	
ART UNIT	**PAPER NUMBER**
2613	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/775,911	MORGAN, DENNIS R.	
	Examiner	Art Unit	
	David Lee	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/25/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 6 and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The variables "a", "b", "P", "Q", "T", and "n" are not defined in the specification in such a way to enable a skilled artisan to use the invention.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 6 and 12, it is not clear what the variables "a", "b", "P", "Q", "T", and "n" constitute, rendering the claims indefinite for failing to distinctly claim the subject matter which applicant regards as the invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen ("Optical All-pass Filters for Polarization Mode Dispersion Compensation", Optics Letters. Vol. 25, No. 12. June 15, 2000) in view of Bessios (US Patent No. 7,110,683).

Regarding claims 1 and 13, Madsen teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Abstract), comprising the steps of: reducing said polarization mode dispersion using a cascade of all-pass filters (see fig. 1) and adjusting coefficients of said all-pass filters (see, e.g., 3rd full paragraph of col. 1 on pg. 879). Madsen does not expressly disclose that the coefficients are adjusted using a least mean square algorithm, but he does disclose that adaptive and tunable filters are used (see first full paragraph of col. 1 on pg. 879). A skilled artisan would have readily recognized that adaptive FIR filters, such as the one disclosed by Madsen, usually require an algorithm to determine proper coefficients for the filtering mechanism. Furthermore, it is well known in the art that a least mean square algorithm can be advantageously used in adaptive FIR filters for optimizing system coefficients. For example, Bessios, from a similar field of endeavor, teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Title and Abstract) comprising, inter alia, the step of adjusting coefficients of adaptive FIR filters using a least mean square algorithm (see fig. 4; see also col. 4, lines 52-63 and col. 5, lines 40-51). It would have been obvious to a skilled artisan at the time of invention to use an LMS

algorithm, as taught by Bessios, to adjust the coefficients of the filters of Madsen in order to calculate and optimize the coefficients associated with the filters so as to effectively compensate for polarization mode dispersion.

Regarding claims 2 and 14, Madsen teaches a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers (see fig. 1: note APF1 and APF2 and the tunable couplers as illustrated in fig. 1b).

Regarding claims 3 and 15, the combined invention of Madsen and Bessios teaches that the coefficient values are adjusted to minimize a cost function (the cost function is understood as the transfer matrix of eq. 3 of Madsen; see also Table 1 in col. 5 of Bessios).

Regarding claims 4 and 16, Madsen teaches the step of measuring said polarization mode dispersion in a received optical signal (see Abstract).

Regarding claims 5 and 17, Madsen teaches that the measuring step employs a tunable narrowband optical filter to render information from energy detector measurements (see last sentence of first full paragraph of col. 1 on pg. 879).

5. Claims 7-11 and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen in view of Wang et al. (US Pub. No. 2005/0008070 A1).

Regarding claims 7 and 18, Madsen teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see Abstract), comprising the steps of: reducing said polarization mode dispersion using a cascade of all-pass filters (see fig. 1) and adjusting coefficients of said all-pass filters (see, e.g., 3rd full paragraph of col. 1 on pg. 879). Madsen does not expressly disclose that the coefficients are adjusted using a Newton algorithm,

but he does disclose that adaptive and tunable filters are used (see first full paragraph of col. 1 on pg. 879). A skilled artisan would have readily recognized that adaptive FIR filters, such as the one disclosed by Madsen, usually require an algorithm to determine proper coefficients for the filtering mechanism. Furthermore, it is well known in the art that a Newton algorithm can be advantageously used in adaptive FIR filters for optimizing system coefficients. For example, Wang, from a similar field of endeavor, teaches a method for compensating for polarization mode dispersion in an optical fiber communication system (see, e.g., second half of paragraph 0071) comprising, inter alia, the step of adjusting coefficients of adaptive filters using a Newton algorithm (see, e.g., paragraphs 0052 and 0074). It would have been obvious to a skilled artisan at the time of invention to use an Newton algorithm, as taught by Wang, to adjust the coefficients of the filters of Madsen in order to calculate and optimize the coefficients associated with the filters so as to effectively compensate for polarization mode dispersion. It is parenthetically noted that Wang further teaches that an LMS algorithm could also be used to calculate the coefficients (see paragraph 0074: an LMS algorithm is a "steepest descent" algorithm).

Regarding claims 8 and 19, Madsen teaches a two-channel structure consisting of multiple cascades of all-pass filters and directional couplers (see fig. 1: note APF1 and APF2 and the tunable couplers as illustrated in fig. 1b).

Regarding claims 9 and 20, the combined invention of Madsen and Wang teaches that the coefficient values are adjusted to minimize a cost function (the cost function is understood as the transfer matrix of eq. 3 of Madsen; see also paragraph 0074 of Wang).

Regarding claims 10 and 21, Madsen teaches the step of measuring said polarization mode dispersion in a received optical signal (see Abstract).

Regarding claims 11 and 22, Madsen teaches that the measuring step employs a tunable narrowband optical filter to render information from energy detector measurements (see last sentence of first full paragraph of col. 1 on pg. 879).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Lee
Patent Examiner

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